



Initiative Towards Non-Precious Metal Polymer Fuel Cells (NonPrecious)

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INITIATIVE TOWARDS NON-PRECIOUS METAL POLYMER FUEL CELLS (NonPrecious)

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The project, NonPrecious, is devoted to developing fuel cell catalysts for PEM fuel cells (i.e. to work in an acidic environment) without the use of platinum group metals. This has been a dream ever since the PEM fuel cell was developed in the 1960's. It is not an easy task since platinum group metals combine high chemical stability with a binding strength of the reactants in the right range. Other metals are either instable in acid or inactive. The most successful class of alternative catalyst materials for oxygen reduction in acidic medium is molecular-like iron-nitrogen complexes embedded in aromatic carbon structures. High activity, approaching that of platinum, have been reported, but there is still a long way to go in terms of activity as well as stability. The project was initiated based on results at DTU Energy on self-organizing particles synthesized in a high-pressure autoclave from simple precursors¹. Experienced groups from INRS in Canada and Guangxi University in China are partners in the project. Selected findings with oxygen reduction catalysts synthesized in the project will be presented.

¹ Y. Hu, J. O. Jensen, W. Zhang, L. N. Cleemann, W. Xing, N. J. Bjerrum and Q. Li., Hollow Spheres of Iron Carbide Nanoparticles Encased in Graphitic Layers as Oxygen Reduction Catalysts. *Angew. Chem. Int. Ed.* 53 (14) 3675 –3679 (2014)